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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,636

03/19/2004

Donald J. Lewis

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03/25/2008

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EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

03/25/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/805,636	Applicant(s) LEWIS ET AL.	
	Examiner TU M. NGUYEN	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16, 18, 29-31, 33-35 and 52-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16, 18, 29-31, 33-35 and 52-60 is/are rejected.
- 7) ☒ Claim(s) 61-64 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Request for Continued Examination (RCE) and an Applicant's Amendment filed on December 19, 2007 have been entered. Claim 17 has been canceled; and claims 16, 29, 52, 55, 58, and 60 have been amended. Overall, claims 16, 18, 29-31, 33-35, and 52-64 are pending in this application.

Election/Restriction

2. Applicant's election without traverse of the species of Figure 15 in the Applicant's Response to Restriction Requirement is acknowledged. Claims 16, 18, 29-31, 33-35, and 52-64 are readable thereon and will be examined in their full merit.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 52-59 and 60 are rejected under 35 U.S.C. 102(b) as being anticipated by Boyer et al. (U.S. Patent 6,382,193).**

Re claims 52-54 and 60, as shown in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- operating the engine in a first mode (Boosted VDE mode) with a first number (1 to 4 cylinders) of cylinders deactivated, and a first number of valves (2 valves (18, 20)) operating in each active cylinder to carry out combustion in the active cylinders; and

- operating the engine in a second mode (VDE mode) with a second number (4 cylinders) of cylinders deactivated, and a second number of valves (1 valve (20)) operating in each active cylinder to carry out combustion in the active cylinders, wherein the first number (1 to 4 cylinders) of cylinders deactivated is different from the second number (4 cylinders) of cylinders deactivated, and the first number of valves (2 valves) operating is different from the second number (1 valve) of valves operating.

Re claim 55, as depicted in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- operating the engine in a first mode (Boosted VDE mode) with a first number (1 to 4 cylinders) of cylinders deactivated, and a first configuration (both valves (18, 20)) of valves operating in active cylinders to carry out combustion in the active cylinders; and

- operating the engine in a second mode (VDE mode) with a second number (4 cylinders) of cylinders deactivated, and a second configuration (valve (20)) of valves operating in the active cylinders to carry out combustion in the active cylinders, and the first configuration of valves operating is different from the second configuration of valves operating.

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Re claims 56-57, in the method of Boyer et al., the first number of cylinders deactivated is the same as or different from the second number of cylinders deactivated.

Re claims 58-59, as illustrated in Figures 1, 2, and 4, Boyer et al. disclose a method for operating an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- varying a number of deactivated cylinders and varying a number of active valves in each of the active cylinders to regulate engine output during engine operation (see Figure 4 for Boosted VDE mode) (also see lines 45-55 of column 2); and

- varying a number of strokes of a cylinder cycle to further regulate engine output during engine operation (see lines 12-16 of column 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyer et al.

Re claim 16, as shown in Figures 1, 2, and 4, Boyer et al. disclose a control method for selecting and controlling cylinders and valves (18, 20) in an internal combustion engine, the method comprising:

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- a first mode (Full Cylinder mode) of operation to select and deactivate a first number (zero) of cylinders, and to carry out combustion in the remaining cylinders with a first number (1 valve (20)), of active valves of each of the cylinders carrying out combustion; and

- a second mode (Boosted VDE or VDE mode) of operation to select and deactivate a second number (1 to 4 cylinders or 4 cylinders) of cylinders, and to carry out combustion in the remaining cylinders with a second number (2 valves (18, 20) or 1 valve (20)) of active valves of each of the cylinders carrying out combustion, wherein the first number (zero) of cylinders is less than the second number (1 to 4) of cylinders.

Boyer et al., however, fail to disclose that the first number of active valves is greater than the second number of active valves.

Boyer et al. disclose the claimed invention except for specifying an optimum number of active valves for each mode such that the first number of active valves is greater than the second number of active valves. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum number of active valves for each mode, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Re claim 18, in the method of Boyer et al., the first number of active valves and the second number of active valves form different valve patterns (in the case of Full Cylinder mode versus Boosted VDE mode).

7. Claims 29-31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boyer et al. in view of Hori et al. (U.S. Patent 6,401,684).

Re claim 29, as illustrated in Figures 1, 2, and 4, Boyer et al. disclose a method for determining the number of cylinders to operate in an internal combustion engine with electrically actuated valves (18, 20), the method comprising:

- determining an operating condition (Boosted VDE mode) of the internal combustion engine;
- selecting a number of cylinders (4 firing cylinders) to operate to carry out combustion based on the engine operating condition;
- determining a number (two valves (18, 20)) of electrically actuated valves to operate in a selected cylinder carrying out combustion based on the number of cylinders; and
- operating the number of electrically actuated valves in the selected cylinder during a cycle of the internal combustion engine.

Boyer et al., however, fail to disclose that the method further comprises a step of determining an operating condition of at least one of the electrically actuated valves; and that the step of selecting a number of cylinders to operate is further based on the electrically actuated valve operating condition.

As shown in Figure 1, Hori et al. disclose a system for controlling an engine equipped with electromagnetically operated engine valves (2, 3). As illustrated in Figures 11 and 22, Hori et al. teach that it is conventional in the art to monitor and determine an operating condition of the valves; and if a valve is determined to be abnormal, the cylinder having the abnormal valve is deactivated. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Hori et al. in the method of Boyer et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art

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to reduce engine misfires, emissions, and engine performance degradation due to abnormal valves.

Re claim 33, in the modified method of Boyer et al., the operating condition of the internal combustion engine is a speed of the internal combustion engine.

Re claims 34-35, in the modified method of Boyer et al., the operating condition of the electrically actuated valve is a temperature or an impedance of the electrically actuated valve, as taught by Hori et al.

Re claims 30-31, the modified method of Boyer et al. discloses the invention as cited above, however, fails to disclose that the operating condition of the internal combustion engine is an engine temperature or a time since start of the internal combustion engine.

Boyer et al. disclose the claimed invention except for utilizing the parameters such as “engine temperature” or “a time since start of the engine” to determine an engine torque requirement. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use each of said parameters to determine an engine torque requirement in Boyer et al., since the recitation of such amounts to an intended use statement. Note that both “engine temperature” and “a time since start of the engine” are routinely utilized in the art to determine an engine torque demand; and the mere selection of each parameter for use in Boyer et al. would be well within the level of ordinary skill in the art.

Allowable Subject Matter

8. Claims 61-64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

March 17, 2008

/Tu M. Nguyen/

Tu M. Nguyen

Primary Examiner

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